

Mobile Learning Applications: Characteristics, Perspectives, And Future Trends

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Abstract - The availability of the Internet and the fast growth of smartphone technology leads to the emergence of the trend of using mobile applications in various aspects of life. Nowadays, people could perform various tasks and duties with mobile phone applications anytime and everywhere. There are many characteristics of successful mobile applications. This study aims to investigate the mobile applications and it will focus on the mobile characteristics. This paper discusses the necessary elements of mobile learning applications. Systematic literature review technique has been used in determining the characteristics of mobile learning applications discussed in literature. The paper might be useful for the researchers and developers who are interested in developing mobile learning applications.

Keyword - Mobile application, multimedia, interface , mobile learning.



1 INTRODUCTION

Technology has grown very advanced in the last decades and is continuously growing rapidly. It enables people to carry only a device for purposes previously were possible with multiple devices, like mp3 players, cameras, video recorders, as well as spreadsheet. The use of mobile technology and mobile applications become common in everyday life worldwide [1,2], impacting various aspects of life [3, 4].

Not only that, the availability of diverse interactive mobile applications and different platforms [5,6] links people in the world through social-networking applications. With the social-networking applications, people in different continents are connected closely, enabling major works being carried out from a distance. Social-networking services can increase the potential of person-to-person contact, connected easily, and extends user experience. In such situation, appropriate consideration on information recording, conversion, and transformation are very important.

Nowadays, the mobile application development has gained the attention of developers and it becomes a wealthy area in application development [7] and there are different trends proposed [8]. It includes the infrastructure that enables users to easily download applications. As a result, Bosomworth (2015) found that 80% access to Websites are through web devices. This shows that users use mobile devices and their

applications very consistently.

This paper will provides good background to the researchers of mobile applications espacaly for the new researchers of this area, where the paper will focus on some important aspects of mobile applications ,the rest of this paper will be as follow ,the following section will state some the systemic literature review and techniques that used in mobile application through previous years, the next section will discuss the mobile learning applications as general , and then the mobile learning applications elements will be discussed in details, after that the characteristics of high quality mobile applications will be demonstrated, and the last section will be the conclusion.

2 THE TECHNIQUE-SYSTEMATIC LITERATURE REVIEW

Systematic literature review has been used in identifying the characteristics of mobile learning application. Previous works were identified in the literature. Having gathered the appropriate works, this study constructs a metric for the purpose of recording all considerations in all identified previous works. Briefly, the results of the systematic literature review are displayed in Table 1.

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TABLE 1. RESULTS OF SYSTEMATIC LITERATURE REVIEW

Characteristic	REFERENCES																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
User interface	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Convenience	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Performance	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Personal	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Connectivity	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Compatibility	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Fast loading and uploading	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Reachability	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Legend:

1. Ally, 2009; 2. Nusir, Alsmadi, Al-Kabi, & Sharadgah, 2013; 3. Sharples & Spikol, 2017; 4. Shen, Wang, & Pan, 2008; 5. Ward, Finley, Keil, & Clay, 2013; 6. Akour, 2009; 7. Cobcroft, Towers, Smith, & Bruns, 2006; 8. Traxler, 2007; 9. Waycott, Jones, & Scanlon, 2005; 10. Crompton, Burke, & Gregory, 2017; 11. Heflin, Shewmaker, & Nguyen, 2017; 12. Deloitte, 2013; 13. Elkheir & Mutalib, 2015; 14. Laurillard, 2007; 15. Cohen, 2010; 16. Ozdamli & Cavus, 2011; 17. Dehlinger & Dixon, 2011; 18. Georgiev & Georgieva, 2009; 19. Rao et al., 2011; 20. Elkheir & Mutalib, 2015b; 21. Wasserman, 2010; 22. Friedl et al., 2006; 23. Vicsi et al., 2000.

3 MOBILE LEARNING APPLICATION

As mentioned in the previous section the well-designed applications help satisfying users [9, 10]. It includes for applications for mobile learning. Briefly, mobile learning is defined as “education or training conducted by means of portable computing devices such as smartphones or tablet computers”[11]. It complements the traditional classroom with one that is more interactive and engaging [32]. It is a method of giving the educators the ability to connect with learners on a more personal level with devices that they use on a regular basis [12].

In current advancement, mobile applications become an important educational tool that represent an excellent platform to variety the kind and level of learners, and mobile learning applications focus on the ways of delivering different educational content using mobile devices where learners could move among objects, locations, times and social interactions. The mobile applications provide learners a classroom using mobile technologies anywhere and anytime. It supports for collaboration involving students and teachers from different locations, and help students where they can work in group rather than working individually in solving some problems, and they can share the archived solution with the class.

Some researches results proved that using new forms and tools of teaching as tablet PDA in drawing give the students chance to spend more time in working on the specific target [13]-[15]. In addition, it provides educators

with the opportunities to reimagine teaching and learning and this could increase the students understanding [16] & [17], besides breaking down traditional barriers to training and providing an excellent way of training that creates a more conducive environment for real-time, on-the-go learning (by [18]).

Over the benefits, some studies discuss the challenges of mobile applications [19, 20]. Also, some other studies discuss the possibilities or factors that enable the use of mobile learning and the motivational factors that influence its utilization [21, 22].

4 MOBILE LEARNING APPLICATION ELEMENTS

Many research works have focused on theory-based mobile learning applications. They try to find the motivation beyond the mobile learning applications [23] [22] including the elements to be concerned with any mobile applications such as learner, teacher, environment, content, and assessment. The first element is learner, or the student who will be served and who will get benefit from the applications. The second element is teacher; a real teacher, book, and other media elements that store learning information and sources. Environment is the third element, which represents the place that the students will be when they get the information. The fourth element is content, which include all materials of subjects or the information and the privileges that the learners will get such as access to all of the unit content, the learning outcomes, the required assignments and relevant resources. Finally, assessment is also an important element, which is the evaluation on the performance of learners, and all students’ record and report must be included to the mobile applications with the full software packages, examination materials, chat and discussion board, examination room, online quizzes, and so forth.

5 CHARACTERISTICS OF HIGH QUALITY MOBILE APPLICATIONS

There are many works concerning on the characteristics of the mobile applications [24] [25] [26] [27], which are combined in Figure 1. Similarly, many usability principles and criteria for mobile application have been discussed in literature, such as the work by [28]. In general, we can say that the mobile characteristics could be classified into two categories; the first category is called multimedia category that includes user interface, convenience, and personalization option; the second category is performance of applications that includes connectivity of the applications, reachability, security and fast loading and uploading.

User interface and convenience. The user interface and the convenience of mobile application, is a little bit different than that of desktop applications. Certainly, it has some limitations because of the nature of mobile specification such as size, input, and output tools speed, storage capacity. Those are factors need to be taken when designing mobile applications, because user-interface controls influences user

experience [29, 30]. Most of the current mobile applications use touch screen, the and there are flexibility in the number of fingers that used with each application and the accuracy of application which could determine the locations of screen that have been touched.

Performance and the security. Without a doubt, performance consider an important, it concentrates on the speed of application in processing and execution such as loading and uploading contents and the time that needs to executing specific. Meanwhile security always becomes a challenge in application development, and now there are different platforms for a mobile application these platforms are not secured enough, and researcher needs to be focused on this issues and find out some out to secure the tools and that makes the learning applications more reliable and more robustness.

Personal characteristics. Mobile applications should concern on providing personalized learning environments. where by using mobile application for learning facilitates personalized learning for the learner could learn (and collaboration) from any place and at any time allows the learning to be contextualized. It could be done through the flexibility of colors, shapes, layout, and others.

Connectivity characteristics. It must be considered in creating mobile applications. It connects the application and users together. The application must have the technologies that allow good mobile connectivity layer that allows for transportation of all relevant data and tools from the service information layer towards the application. The mobile device is considered a fully connected device where it could be easily connected to other such as tablet, Personal Computer (PC), or Television (TV), and data and information, enabling seamless and continuous transition between devices, where each device simply provides a different modality and view into a central repository of data and information in the information sources and the cloud computing.

Compatibility characteristics. It concentrates on the communication tools concept, which is a reliable and compatible communication protocol. The compatibility enables other implementations or even completely different products to join the network and share information. By applying different format that has the ability to be in an extensible format, and at the same time, it has the ability to add some new features without destroying backwards compatibility. At the same time the mobile applications must use the advances in cloud computing which help users to have an abstract view of multimodal processing services. In the cloud computing all personal data, models, and application specific information can be stored in the cloud, which allows users to interact with the system independent of the specific mobile device they have and enable the mobile application developers to build and easy upgrade ubiquitous applications living in the cloud.

6 CONCLUSION

In order to understand the orientation of mobile application and the way of developing the high quality mobile application as all and mobile learning application especially, the article discussed the important issues about the mobile applications and how learning characteristics and elements. How the up-to-date mobile applications are developed and what are characteristics of high quality mobile applications, and what developers most consider when developing mobile learning application. Further studies can investigate the challenge of mobile applications and development of the mobile platform and compare between the advantages and disadvantages of mobile learning. We think that in the near future, with the rapidly developed technology mobile, the current situation of mobile applications will be changed for the better, this filed will witness more research to provide a good environment for mobile applications and transform education method to transferring using mobile learning. The future of mobile application will take in consideration how to use mobile technology to deliver learning to more people, and it will focus on how to design interactive classes and materials that will make support and increase the using of mobile applications

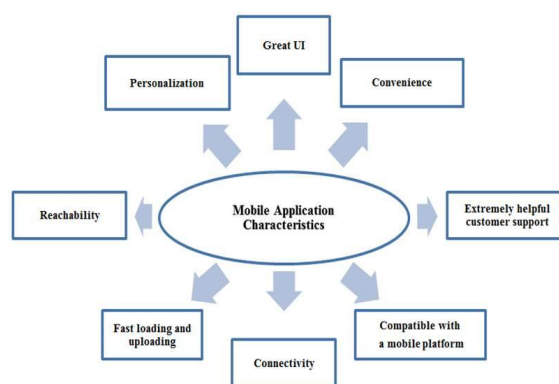


Fig. 1. General Mobile Application Characteristics reflected from the systematic literature review

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